

Dynamic Analysis, Welfare, and Implications for Tax Reform

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**National Bureau of Economic Research Tax Policy and the Economy Conference
Washington, DC
September 22, 2016**

Dynamic Analysis is Not Welfare Analysis: Efficiency Issues

Illustrative Welfare Analysis of a Reduction in Labor Taxes (Assuming a Representative Worker to Whom Tax Revenues Are Rebated Lump Sum)

	Baseline (30% Labor Tax)	Alternative (20% Labor Tax)
Social Benefit (Change in Output)		
Hourly Wage	20	20
Hours Worked per Week	40	45
Output per Week	800	900
Change in Output		100
Social Cost (Change in Value of Leisure)		
Hourly Value of Leisure	15	15
Leisure Hours per Week	80	75
Value of Leisure per Week	1,200	1,125
Change in Value of Leisure		-75
Net Social Benefits		25

Source: CEA calculations.

Dynamic Analysis is Not Welfare Analysis: Distributional Issues

Illustrative Welfare Analysis of Changes in the Distribution of Income

	Baseline	Alternative	Percent Change
Individual Incomes			
Person 1	100	85	-15.0
Person 2	200	195	-2.5
Person 3	10,000	10,500	5.0
Aggregate Welfare			
Mean Income	3,433	3,593	4.7
Mean Log Income	6.37	6.32	-0.7
Mean CRRA Transformation of Income with $\theta = 2$ ¹	0.99	0.99	-0.1

Source: CEA calculations.

¹ CRRA refers to the constant relative risk aversion functional form: $(y^{(1-\theta)}-1)/(1-\theta)$.

An Illustrative Application: Replacing Labor Taxes with Lump-Sum Taxes

- **Baseline policy is proportional 25% income tax, no exemptions**
- **Policy change cuts labor income tax to 22.5% and collects a \$900 per family lump-sum tax**
- **Aggregate economic impacts based on Mankiw-Weinzierl Ramsey model and parameters**
- **Microsimulation using 2010 IRS Public Use File**

Representative Agent Results

- **Before-tax income up 1%**
- **Consumption-equivalent utility up 0.5%**
- **Taxes unchanged, but a 12% dynamic offset**

Distributional Results

Economic Effects of Shifting from a Hypothetical 25% Proportional Income Tax to a 22.5% Labor Income Tax, 25% Capital Income Tax, and \$900 Lump-Sum Tax

Income Class	Percent of Families	Static		Dynamic		
		Percent Change in Tax Income		Percent Change in Pre-Tax Income	Percent Change in After-Tax Income	Percent Change in Utility (Consumption Equivalent) ¹
		Without Financing	After- With Financing			
Bottom Quintile	20.0	2.9	-12.3	1.0	-11.4	-22.4
Second Quintile	20.0	2.7	-3.2	0.9	-2.3	-2.9
Middle Quintile	20.0	2.5	-0.9	0.8	-0.1	-0.6
Fourth Quintile	20.0	2.4	0.3	0.8	1.1	0.7
Top Quintile	20.0	2.3	1.4	0.9	2.3	1.8
All	100.0	2.3	0.3	0.9	1.1	-4.7

Source: CEA calculations.

Note: Aggregate economic impacts are computed using the macroeconomic model of Mankiw and Weinzierl (2004, 2006). Values for individual families are assumed to change by the same percentage as the aggregate values. The distribution of income is derived from the 2010 IRS Statistics of Income Public Use File. See text for additional details.

¹ At the family level, the consumption equivalent utility increase is the percent change in consumption (assuming labor supply remains unchanged at the baseline level) that would yield the utility level realized in the alternative policy scenario. Percent change for an income class is the simple average of the percent change across families. Utility is computed as $\log(\text{after-tax income}) - n^{1+\sigma}$, where n is the value of labor supply generated by the Mankiw-Weinzierl model (assuming an isoelastic specification of labor disutility).

Winners/Losers Analysis

Economic Effects of Shifting from a Hypothetical 25% Proportional Income Tax to a 22.5% Labor Income Tax, 25% Capital Income Tax, and \$900 Lump-Sum Tax

	Percent with Increase	Percent with Decrease
Static		
After-Tax Income	36.3	63.7
Dynamic		
Taxes	67.3	32.7
Pre-Tax Income	96.4	0.0
Leisure	0.0	87.7
After-Tax Income	46.2	53.8
Utility ¹	40.8	59.2

Source: CEA calculations.

Note: Aggregate economic impacts are computed using the macroeconomic model of Mankiw and Weinzierl (2004, 2006). Values for individual families are assumed to change by the same percentage as the aggregate values. The distribution of income is derived from the 2010 IRS Statistics of Income Public Use File. See text for additional details.

¹ Utility is computed as $\log(\text{after-tax income}) - n^{1+\sigma}$, where n is the value of labor supply generated by the Mankiw-Weinzierl model (assuming an isoelastic specification of labor disutility).

Aggregate Presentation

Economic Effects of Shifting from a Hypothetical 25% Proportional Income Tax to a 22.5% Labor Income Tax, 25% Capital Income Tax, and \$900 Lump-Sum Tax

	Baseline (25% Flat Tax)	Alternative (22.5% Labor Tax + \$900 Lump Sum)	Percent Change
Income			
Mean Pre-Tax Income	63,122	63,690	0.9
Mean After-Tax Income	50,221	50,788	1.1
Log After-Tax Income	10.2	10.1	-1.0
Welfare			
Mean Consumption Equivalent Utility Increase ¹			-4.7
Mean Utility	10.00	9.89	
Mean Log of (Utility + 1)	2.39	2.36	
Mean CRRA Transformation of (Utility + 1) with $\theta = 2^2$	0.91	0.90	

Source: CEA calculations.

Note: Aggregate economic impacts are computed using the macroeconomic model of Mankiw and Weinzierl (2004, 2006).

Values for individual families are assumed to change by the same percentage as the aggregate values. The distribution of income is derived from the 2010 IRS Statistics of Income Public Use File. Utility is computed as $\log(\text{after-tax income}) - n^{1+\sigma}$, where n is the value of labor supply generated by the Mankiw-Weinzierl model (assuming an isoelastic specification of labor disutility). See text for additional details.

¹ At the family level, the consumption equivalent utility increase is the percent change in consumption (assuming labor supply remains unchanged at the baseline level) that would yield the utility level realized in the alternative policy scenario.

² CRRA refers to the constant relative risk aversion functional form: $(u^{1-\theta}-1)/(1-\theta)$.

Implications for Real Tax Reform: Growth

Select Estimates of the Effect of Tax Reform on the Level of Output

Source	Policy Change	Short-Run	Long-Run
Treasury (2006b)	President's Advisory Panel on Tax Reform		
	Simplified Income Tax	0.0 - 0.4	0.2 - 0.9
	Growth and Investment Tax	0.1 - 1.9	1.4 - 4.8
	Progressive Consumption Tax	0.2 - 2.3	1.9 - 6.0
Treasury (2006a)	Permanent Extension of the 2001/2003 Tax Cuts		
	Financed with Future Spending Cuts	0.5	0.7
	Financed with Future Tax Increases	0.8	(0.9)
Altig et al. (2001)	Stylized Revenue-Neutral Tax Reforms		
	Proportional Consumption Tax	6.3	9.4
	Flat Tax with Transition Relief	0.5	1.9

n.r. = Not reported. Red indicates negative values.

Note: Output measure is (in order of preference if multiple measures are reported) national income, real gross national product, and real gross domestic product. Time period for short-run effects varies across studies, but (in most cases) is an average over several years in the first decade. Long-run effects typically reflect estimates of the change in the steady state level of output.

Implications for Real Tax Reform: Distribution

Change in After-Tax Income due to Changes in Average Tax Rates by Income Percentile, 1986 to 2013

Income Percentile	Net of Tax Rate, 1986	Net of Tax Rate, 2013	Percent Change
0-20	90.7	96.7	6.6
20-40	85.5	91.6	7.1
40-60	81.9	87.2	6.5
60-80	79.4	83.0	4.5
80-90	77.2	79.3	2.7
90-95	76.5	77.0	0.7
95-99	76.3	73.7	-3.4
99-100	75.3	66.0	-12.4

Source: CBO (2016); CEA calculations.

Note: Net of tax rate is 100 minus the average tax rate. Change in after-tax income due to changes in average tax rate is the percent change in the net of tax rate.

Conclusion

- 1. Growth is not the same as welfare.**
- 2. Many tax reforms generate their growth effects through reductions in the consumption of non-market goods (e.g., leisure) or through tax increases on more moderate-income workers.**
- 3. When analyzing a change in tax policy, the traditional, static distribution table is often the most useful information for evaluating its welfare impacts.**

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